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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,056	07/15/2003	Ephi Zehavi	MOBI-020/01US (30175-2064	8813

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EXAMINER	
TRAN, KHANH C	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,056	ZEHAVI ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,6-9 and 13-14* is/are rejected.

7)☒ Claim(s) *3-5 and 10-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, 6-9 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal U.S. Patent 6,282,500 B1 in view of Choi U.S. Patent 5,581,582.

Regarding claim 1, in column 4 lines 5-15, referring to FIG. 2, a transceiver 200 uses at least one antenna 210 for receiving communication signals, which are transferred to an analog receiver 214, where they are down-converted, amplified, and digitized.

Referring to FIG. 5, in column 6 lines 30-40, Agrawal teaches that Cross-Product Generator 506 performs a cross-product operation between the current I and Q samples. In view of that, the sampling step is performed in previous stage to produce samples for the cross-product operation.

In column 6 lines 30-60, also referring to FIGS. 5 & 6, Cross-Product Generator 506 performs a cross-product operation between the current I and Q samples and the previous I and Q samples, as shown in a step 606. The output of Cross-Product Generator 506 represents the change in phase between the two samples.

Agrawal teach estimation the change in phase between the two samples, however does not explicitly teach computing a phase difference between a first one of samples, corresponding to the first symbol, and a second one of the samples, corresponding to the second symbol as set forth in the application claim.

Choi discusses FIG. 2B Prior art to calculate the difference between the phase between the phase information transmitted from the current symbol period and the phase information transmitted from immediately preceding symbol period. Because the transmission phase information is varied by transmission information and the phase between the phase information transmitted from the current symbol period and the phase information transmitted from immediately preceding symbol period is much more accurate representation than instantaneous phase difference, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Agrawal teachings can be modified to include prior art teachings as discussed in Choi invention.

Agrawal does not explicitly teach comparing the phase difference to a difference between the first and second symbols so as to find a frequency offset of the transmission frequency relative to an expected frequency.

Referring back to Choi invention, in column 5 lines 25-40, Choi teaches that the frequency offset signal depends on how much the difference in phase between each complex-number sample and the preceding complex-number sample one symbol period earlier departs from the transmission phase information determined from a difference

between each complex-number sample and the preceding complex-number sample one symbol period earlier.

Agrawal and Choi teachings are in the same field of endeavor, because, in column 6 lines 50-60, Agrawal suggests other circuit configurations can be employed to generate a frequency estimate based on output of Cross-Product Generator 506 relative to known Pilot symbol, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Agrawal teachings can be modified to implement Choi teachings as discussed above.

Regarding claim 2, as recited in claim 1, Cross-Product Generator 506 performs a cross-product operation between the current I and Q samples and the previous I and Q samples, as shown in a step 606. The output of Cross-Product Generator 506 represents the change in phase between the two samples.

Regarding claim 6, FIG. 5 further includes a phase Rotator 502 responsive to the frequency offset.

Regarding claims 7 and 14, Agrawal preferred input signal is quadrature phase-shift-key (QPSK) modulated pilot signal. Nevertheless, one of ordinary skill in the art would have recognized that the automatic frequency control (AFC) as taught by Agrawal would also apply to frequency shift key modulated signal because the system in FIG. 5

coherently demodulate the received signal. For coherent demodulation, the phase error needs to be computed and the frequency is estimated based on the phase error.

Regarding claim 8, claim 8 is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 9, claim 9 is rejected on the same ground as for claim 2 because of similar scope.

Regarding claim 13, claim 13 is rejected on the same ground as for claim 6 because of similar scope.

Allowable Subject Matter

2. Claims 3-5 and 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Walley U.S. Patent 5,732,111 discloses "Frequency Error Compensation For Direct Sequence Spread Spectrum Systems".

Rouphael U.S. Patent 6,304,620 B1 discloses "Sign-Cross Product Automatic Frequency Control Loop".

Chen U.S. Patent 6,873,666 B2 discloses "Circuit And Method For Symbol Timing Recovery In Phase Modulation Systems".

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT

Khanh cong Tran 09/13/2006

Primary Examiner KHANH TRAN